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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/11507

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : BO1D 71/00, BO1D 39/00

US CL : 210/500.27, 500.41, 500.42, 500.23; 264/41, 634, 209.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 210/500.27, 500.41, 500.42, 500.23; 264/41, 634, 209.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,838,904 A (SANDERS, JR. et al) 13 June 1989, entire disclosure.	1-8, 12-16, 22-25
Y		9-11, 17-22
X	US 5,891,572 A (MACHERAS et al) 06 april 1999, columns 2, lines 21-68, columns 206, and column 7, lines 1-65.	1, 3, 4, 5
Y	US 5,911,880 A (KELIN et al) 15 June 1999, abstract, column 3, lines 40-68, column 4, lines 1-52, and column 8, lines 24-68, through column 9, lines 1-32.	1-25
Y	US 5076,935 A (KRAUS et al) 31 December 1991, entire disclosure.	1-25
Y	US 4,051,300 A (KLEIN et al) 27 September 1977, column 3, lines 15-68, and column 4, lines 1-35.	1-25

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"B" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

15 June 2003 (15.06.2003)

Date of mailing of the international search report

21 JUL 2003

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